REMARKS

The specification has been amended to correct minor typographical errors. Accordingly, Applicants respectfully request that the above amendments to the specification be approved. Applicants submit that no new matter has been added by virtue of the amendments to the specification.

In section 2 of the Office Action, the Examiner has objected to claims 8 and 10 due to various informalities. In particular, the Examiner notes that the claimed "offsets" is ambiguous. Accordingly, Applicants have amended claim 8 to overcome the Examiner's objections. Claim 8 now recites, in part, *two offsets including a first offset stored in a first offset map and a second offset stored in a second offset map.* In view of the above amendments, Applicants respectfully request the allowance of claims 8 and 10.

Claims 1-3, 5-7, 13, 25-26, and 54-55 are rejected under 35 U.S.C. 102(e) as being allegedly anticipated by Tarolli et al. (U.S. Patent No. 5,831,624). The Applicants respectfully traverse this rejection for the reasons presented below.

Claim 1 now recites:

1.   *A method for mapping a texture onto a surface of a computer generated object, comprising:*

approximating a true pixel color by performing

a number of texturing operations, said texturing

operations being determined by a geometric shape of

a projection of a pixel on the texture, **each of said**

texturing operations including accessing a mipmap at

least one time in a marching direction corresponding

to the geometric shape of the projection of the

pixel on the texture; and

averaging results of said texturing operations.

The claimed features above advantageously provide significant

image enhancement in an efficient manner at real-time

rendering speed, at lower system costs and without requiring

significantly more hardware.

Tarolli discloses a conventional method of determining a

pixel value by weighing the values of <u>four aggregate texels</u>

<u>that are closest to the center of the pixel. The four</u>

<u>aggregate texels are determined based upon the distance from</u>

<u>the center of each aggregate texel to the pixel center</u>.

Tarolli does not disclose or suggest, as recited in claim 1,

approximating a true pixel color by performing a number of

texturing operations, said texturing operations being

determined by a geometric shape of a projection of a pixel on

*the texture, **each of said texturing operations including
accessing a mipmap at least one time in a marching direction
corresponding to the geometric shape of the projection of the
pixel on the texture**.*

For the reasons stated above, Applicants submit that
claim 1 is patentably distinct over Tarolli. Therefore,
Applicants request allowance of claim 1. Claims 2, 3, 5, 6,
and 25 include additional limitations further defining the
claimed invention. Based on these limitations and their
dependence on claim 1, Applicants submit that claims 2, 3, 5,
6, and 25 are likewise in a condition for allowance.

Claim 6-7 and 25-26 have been rejected under 35 U.S.C.
102(e) as allegedly being anticipated by Tarolli. The
Examiner correctly states that Tarolli "does not explicitly
teach modifying specularly reflected light intensity by
combining the reflected light intensity with a specular
coefficient; and retrieving the specular reflectance
coefficient from a specular reflectance coefficient map
associated with the surface." The Examiner then states that
the claimed concepts would have been allegedly well known to a
person of ordinary skill in the art at the time the invention
was made.

However, Applicants respectfully submit that an element required to establish a prima facie case under 35 U.S.C. 102(e) is a subsequently issued U.S. patent describing the claimed invention. Therefore, the Applicants respectfully submit that the rejections of claims 6-7 and 25-26 is improper. The Applicants respectfully request the Examiner to provide a valid reference based upon the requirements under 35 U.S.C. 102(e) or, alternatively, to permit the allowance of these claims.

Claim 13 now recites:

13. *A device for generating a texture map, environment map, reflectance map and detail map, comprising:*

a memory unit for storing at least one of a texture map, an environment map, a reflectance map, and a detail map; and

a dedicated arithmetic unit, responsive to said memory unit, for generating at least one of said texture map, environment map, reflectance map, and detail map, **wherein at least one of said maps is linked to another of said maps.**

The claimed features above permits, for example, the reflectance map to be accessed at the same coordinates as the texture map. This advantageously results in no required additional overhead for a rasterizer operating with the device of claim 13. The claimed features above also allows exploitation of the enormous transfer rates internal to a chip and provides an elegant solution to the memory access bottleneck of high-quality texture mapping.

Tarolli discloses, in Figure 4, a texture mapping unit 310C that transmits to a texture memeory 312C a mipmap address (for each pixel) from which each pixel value is determined. (Col. 6, line 59 to Col. 7, line 3). Tarolli does not disclose a device for generating a combination including a texture map, an environment map, reflectance map, and detail map, let alone the linking between **at least one of the maps to another one of the maps**. Therefore, Tarolli does not disclose or suggest, as recited in claim 13, *a device for generating a texture map, environment map, reflectance map and detail map, including a dedicated arithmetic unit, responsive to a memory unit, for generating at least one of said texture map, environment map, reflectance map, and detail map,* **wherein at least one of said maps is linked to another of said maps**.

Claim 54 now recites:

54.   A texturing unit for mapping a texture to a surface
of a computer generated object, which texture comprises a
mipmap, which mipmap comprises a plurality of levels,
each of which levels comprises at least one texel, the
texturing unit comprising:

a control unit for receiving an input signal and
determining a set of N footprint texel locations **oriented
in a marching direction corresponding to a shape of a
projection of a pixel on the texture** and at least one
footprint level of detail from the input signal, which
input signal includes information about a location and
the shape of the projection of the pixel on the texture;

a Random Access Memory (RAM) coupled to the control
unit for,

storing information representing the texture,

receiving the set of N footprint texel

locations **oriented in the marching direction

corresponding to the shape of the projection of the

pixel on the texture** and the footprint level of

detail from the control unit,⸺⸺⸺

Similarly, for the similar reasons stated above regarding claim 1, Tarolli doen not disclose or suggest, as substantially recited in claim 54, a texture unit including: *a control unit for receiving an input signal and determining a set of N footprint texel locations **oriented in a marching direction corresponding to a shape of a projection of a pixel on the texture** and at least one footprint level of detail from the input signal, which input signal includes information about a location and the shape of the projection of the pixel on the texture; and a Random Access Memory (RAM) coupled to the control unit for, storing information representing the texture, receiving the set of N footprint texel locations **oriented in the marching direction corresponding to the shape of the projection of the pixel on the texture** and the footprint level of detail from the control unit............*

For the reasons stated above, Applicants submit that claim 54 is patentably distinct over Tarolli. Therefore, Applicants request allowance of claim 54. Claim 55 includes additional limitations further defining the claimed invention. Based on these limitations and its dependence on claim 54, Applicants submit that claim 55 is likewise in a condition for allowance.

Claims 4, 14-15, and 34 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Tarolli et al. (U.S. Patent No. 5,831,624). The Applicants respectfully traverse this rejection for the reasons presented below.

For the reasons stated above, Applicants submit that claim 1 is patentably distinct over Tarolli. Claim 4 includes additional limitations further defining the claimed invention. Based on these limitations and its dependence on claim 1, Applicants submit that claim 4 is likewise in a condition for allowance.

For the reasons stated above, Applicants submit that claim 13 is patentably distinct over Tarolli. Claim 14 includes additional limitations further defining the claimed invention. Based on these limitations and its dependence on claim 13, Applicants submit that claim 14 is likewise in a condition for allowance.

Claims 14-15 and 34 are rejected under 35 U.S.C. section 103 as allegedly being unpatentable over Tarolli. The Examiner correctly states that Tarolli does not explicitly teaches performing filtering a previous half-frame. The Examiner then states that "it would have been obvious to a person of ordinary skill in the art at the time the invention

was made to perform filtering the previous half frame in order to ensure the texture value produced from the step of prefiltering ready for the step of filtering."

Tarolli discloses a method of determining a pixel value based upon one or more texel values from one of two mipmap levels. The mipmap level chosen is based upon the fractional postion of the level-of-detail (LOD) value and the position of the pixel. Tarolli does not disclose or suggest, as substantially recited in claims 15 or 34, a device for mapping interlaced real time video images including *means for accessing pixels of a previous interlaced half-frame (scanline) to perform filtering*.

Furthermore, the Applicants respectfully submit that the rejections of claims 14-15 and 34 is improper. The Applicants respectfully request the Examiner to provide a valid reference supporting the above rejection or an affidavit under 37 C.F.R. 1.104(d)(2) (formerly 37 C.F.R. 1.107(b)) detailing the Examiner's reasoning for the above rejection or, alternatively, to permit the allowance of these claims.

Claims 8-12, 27-28, and 56-57 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Tarolli et al. (U.S. Patent No. 5,831,624) in view of Chelstowski et al.

(U.S. Patent No. 5,461,712). The Applicants respectfully traverse this rejection for the reasons presented below.

Claim 8 now recites:

8. *A method for adding detail to a texture map comprising at least one texture element, the method comprising:*

generating a detail map;

*assigning a pointer into said detail map to at least one of the texture elements of the texture map to generate a pointer map, said pointer comprising two offsets **including a first offset stored in a first offset map and a second offset stored in a second offset map;***

interpolating detail color based on the generated detail map;

***interpolating texture color based on the texture map;** and*

combining detail color with texture color to generate a pixel color.

The claimed features above permits detail mapping to be added to a texture map to produce higher quality images at real-time rendering speed and lower system costs.

The Examiner correctly states that Tarolli does not teach assigning a pointer into the detail map to at least one of the texture elements to generate a pointer map. In an attempt to overcome the deficiency of Tarolli, the Examiner relies on Chelstowski to show assigning a pointer into the detail map to at last one of the texture element to generate a pointer map. However, Chelstowski does not disclose or suggest, as substantially recited in claim 8, *a method of adding detail to a texture map, comprising: assigning a pointer into said detail map to at least one of the texture elements of the texture map to generate a pointer map, said pointer comprising two offsets **including a first offset stored in a first offset map and a second offset stored in a second offset map; interpolating detail color based on the generated detail map; interpolating texture color based on the texture map; and combining detail color with texture color to generate a pixel color***. Therefore, the Applicants respectfully submit that claim 8 is patentably distinguishable over Tarolli in view of Chelstowski.

Applicants also submit that there is no suggestion to combine Tarolli and Chelstowski for the following reasons. First, the Examiner correctly stated that Tarolli makes no

suggestion of assigning a pointer into the detail map, let alone a pointer comprising two offsets including a first offset stored in a first offset map and a second offset stored in a second offset map.

Second, the combination of Tarolli and Chelstowski is improper since the combination would require a substantial reconstruction and redesign of the elements shown in Tarolli. (See MPEP 2143.01). In particular, Figure 4 of Tarolli shows a texture mapping unit for determining a pixel value based upon one or more texel values from one of two mipmap levels. There is no suggestion in the references on how to modify Tarolli's texture mapping unit to work with the texture manager of Chelstowski. Furhtermore, the references do not suggest or disclose any interface circuitries, systems, techniques or software that permit Tarolli's texture mapping unit to function with Chelstowski's texture manager. Therefore, the combination of Tarolli and Chelstowski is improper.

For the reasons stated above, Applicants submit that claim 8 is patentably distinct over Tarolli. Therefore, Applicants request allowance of claim 8. Claims 9-12 and 27-28 include additional limitations further defining the claimed invention. Based on these limitations and their dependence on

claim 8, Applicants submit that claims 9-12 and 27-28 are likewise in a condition for allowance.

For the reasons stated above, Applicants submit that claim 54 is patentably distinct over Tarolli. Therefore, Applicants request allowance of claim 54. Claims 56-57 include additional limitations further defining the claimed invention. Based on these limitations and their dependence on claim 54, Applicants submit that claims 56-57 are likewise in a condition for allowance.

Applicants believe that this application is now in condition for allowance of all claims remaining herein, claims 1-15, 25-28, 34, 54-62 as amended, and therefore, an early Notice of Allowance is respectfully requested. If the Examiner believes that direct contact with Applicants' attorney would help advance the prosecution of this case to finality, she is invited to telephone the undersigned at the number given below.

The Applicants also hereby request and petition for an extension of time of two (2) months for this amendment in response to the office action mailed April 5, 1999. Enclosed herewith is a chedk of $380 for the requisite extension fee. Please charge any additional fee required under 37 CFR 1.16 and 1.17 or credit any over payments to deposit account number 19-2555.

Respectfully submitted,
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Date: *September 7, 1999*